

**CLAIMS:**

I claim:

1. A combustion system for use in a gas burning heater, the combustion system comprising:
  - a circularly-shaped burner tube having a plurality of gas exit holes on one side and a means for feeding a controlled amount of gas thereto, said burner tube having a set diameter;
  - a first conical frusta section having a pre-determined first pattern of orifice ports, the first conical frusta having a basal end having a diameter proximate the diameter of the burner tube and a smaller diameter distal end, the basal end of the first conical frusta section being attached to the burner tube at a position radially inward from said gas exit holes; and
  - a second conical frusta section having a pre-determined second pattern of orifice ports, said second conical frusta section having a basal end and a larger diameter distal end, said basal end of the second conical frusta section having a diameter proximate the diameter of the burner tube, said basal end of the second conical frusta section attached to the burner tube at a position radially outward from said gas exit holes.

2. The combustion system of claim 1 wherein said gas exit holes are equally-spaced around said gas tube.

3. The combustion system of claim 2 wherein said gas exit holes are of a predetermined diameter.
4. The combustion system of claim 3 wherein said gas exit holes are orthogonally positioned to a plane defined by the circularly-shaped burner tube.
5. The combustion system of claim 1 wherein said predetermined first pattern of orifice ports are arranged in a spiral-like pattern.
6. The combustion system of claim 5 wherein said predetermined second pattern of orifice ports are arranged in a spiral-like pattern.
7. The combustion system of claim 6 wherein said pre-determined second pattern of orifice ports includes seven rows of orifice ports.
8. The combustion system of Claim 7 wherein the last two rows of the predetermined second pattern of orifice ports proximate the distal end are larger in diameter than the first five rows closest to the basal end.
9. The combustion system of claim 8 wherein said pre-determined first pattern of orifice ports includes seven rows of orifice ports.

10. The combustion system of claim 9 wherein the last two rows of the predetermined second pattern of orifice ports proximate the distal end are larger in diameter than the diameter of the orifice ports positioned in the first five rows closest to the basal end.

11. The combustion system of claim 10 wherein the first row of orifice ports on said first and second frusta conical sections are equal in number to and aligned with said plurality of gas exit holes.

12. A gas heater comprised of:  
a cylindrical housing having an air-intake end and an air-exhaust end;  
a cylindrical liner attached to the inner surface of said cylindrical housing at spaced-apart intervals and positioned generally concentrically within said cylindrical housing and also having an air-intake end and an air-exhaust end;  
means positioned proximate said air-intake end for drawing air in through said air-intake end, through said liner and out the air exhaust end;  
combustion system positioned within said liner at the proximate midpoint of said housing, for burning gas, thereby heating the air as it travels through said liner, the combustion system comprising:

a circularly-shaped burner tube positioned concentrically within said liner and having a plurality of gas exit holes on a side facing the air-exhaust end;

a pair of truncated conical flanges attached to said burner tube proximate and on either side of the gas exit holes, said flanges extending radially outward from said burner tube, and each flange having its own respective pattern of orifice ports;

means for inletting gas into the burner tube;

control means that communicates with said inletting means for variably controlling the amount of gas that enters said burner tube between the range of no gas entry to a pre-determined maximum value; and

ignition means for igniting gas that initially exits said burner tube, said ignition means electrically connected to said control means and is activated when said control means allows gas to enter after being in the no gas entry range.

13. The gas heater of claim 12 wherein said air drawing means comprises a motor attached to a propeller.

14. The gas heater of claim 13 wherein said motor is an electric motor.

15. The gas heater of claim 12 wherein said pattern of orifice ports on both flanges are arranged in a spiral-like pattern.

16. The gas heater of claim 15 where the diameter of said orifice ports on both flanges furthest from the burner tube are larger than the orifice ports closest to the burner tube.

17. A direct-fired heater comprising:

a cylindrical housing having an inlet end and an outlet end;

a combustion system mounted within said housing proximate the longitudinal midpoint of said cylindrical housing; and

a circularly-shaped burner tube having a plurality of gas exit holes on one side and a means for feeding a controlled amount of gas thereto, said burner tube having a set diameter;

a first conical frusta section having a pre-determined first pattern of orifice ports, the first conical frusta having a basal end having a diameter proximate the diameter of the burner tube and a smaller diameter distal end, the basal end of the first conical frusta section being attached to the burner tube at a position radially inward from said gas exit holes; and

a second conical frusta section having a pre-determined second pattern of orifice ports, said second conical frusta section having a basal end and a larger diameter distal end, said basal end of the second conical frusta section having a diameter proximate the diameter of the burner tube, said basal end of the second conical frusta section attached to the burner tube at a position radially outward from said gas exit holes;

a motor mounted within said housing closer to said inlet end and connected to a propeller for drawing air into said inlet, through the housing and out of the outlet; and

a control means including a thermostat for adjusting the volume of gas delivered to said burner tube and for adjusting the speed of the motor, thereby variably adjusting the heat output of the heater.

18. The direct-fired heater of claim 17 further comprising:

a pair of wheels mounted on the underside of said housing closer to the inlet end;

a stand mounted on the underside of said housing closer to the outlet end; and

a handle mounted on the stand; said wheels, stand and handle working together so that the heater can be manually transported like a cart.

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